REMARKS

The Office Action mailed July 11, 2003, has been received and reviewed. Claims 1 through 19, and 33 through 61 are currently pending in the application. Claims 1 through 19, 33 through 46, 50, and 56 through 60 stand rejected. Claims 47 through 49, 51 through 55 and 61 are withdrawn from consideration.

Per this response, Applicants have cancelled claims 19, 38 and 41, amended claims 1, 5-18, 33-37, 39, 40, 42-46, 50 and 58, and respectfully request reconsideration of the application as amended herein.

35 U.S.C. § 102(b) Anticipation Rejections

Anticipation Rejection Based on U.S. Patent No. 3,051,639 to Anderson

Claims 1 through 3, 5 and 6 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Anderson (U.S. Patent No. 3,051,639). Applicants respectfully traverse this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Independent claim 1, as amended herein, is directed to a method of converting one or more reactants to a desired end product. The method comprises: introducing a reactant stream at one end of an axial reactor; heating the reactant stream as the reactant stream flows axially through an injection line; *thoroughly mixing the reactant stream with a heating gas within the injection line*; passing the thoroughly mixed reactant stream axially from the injection line to a reactor chamber; *maintaining a volume defined by the reactor chamber at a substantially uniform temperature as the thoroughly mixed reactant stream passes therethrough*; and producing a desired end product stream at a location adjacent an outlet end of the axial reactor. Applicant submits that Anderson fails to teach all of the limitations of claim 1 of the presently claimed invention.

The Examiner cites Anderson as disclosing an arc torch chemical reactor for the production of acetylene from methane wherein a reactant stream is passed into the reactor and mixed with a heating gas. The Examiner further cites Anderson as teaching that the "temperature is maintained at 5000K, which is a uniform temperature over the length of the reaction zone." (Office Action, page 3). Applicants respectfully disagree.

Anderson teaches three significantly different embodiments of torch reactors. In the first embodiment, as shown in FIG. 1, an arc gas flows around an annular passage formed about the cathode, through a nozzle, and into the reaction chamber. A fluid hydrocarbon is introduced into the *reaction chamber* for mixture and reaction with the heated arc gas. The resulting mixture then passes to a quenching chamber where the mixture is sprayed with a quenching fluid for the cooling thereof. The cooled reaction gases may then be passed to a collector and separated into individual components. (See, col. 3, lines 15-40).

In the second embodiment disclosed by Anderson, as shown in FIG. 2, the arc gas, along with an inert shielding gas used in conjunction with the arc torch, is passed through a passage and into a reaction chamber. The reaction chamber contains a volume of liquid hydrocarbons. The velocity of the heated gases prevents the liquid from flowing back through the passage. The mixing of the gases with the liquid hydrocarbons takes place in the *reaction chamber.* Furthermore, Anderson states that the "cooler liquid hydrocarbon in the upper portion of the [reaction] chamber 60 quenches the hot products of the pyrolysis reaction." (Col. 4, lines 21-22). Such clearly indicates the existence of temperature gradient or a "nonuniform" temperature within the reactor chamber.

In the third embodiment disclosed by Anderson, as shown in FIG. 3, a fluid hydrocarbon is injected into a hot flowing arc gas in a cylindrical passage. The gases are mixed as they pass through a "confining disc" right before entering a quenching zone which is filled with a quenching liquid (i.e., water). (See, e.g. col. 4. lines 61-70).

Applicants submit that Anderson fails to teach, with respect to any of the embodiments disclosed thereby, the thorough mixing of the reactant stream with a heating gas within the injection line, which injection line is positioned within the flow upstream of the reactor chamber.

Additionally, while the Examiner cites Anderson as teaching an arc torch reactor which

maintain a substantially uniform temperature at 5000° K over the length of a reaction zone, Applicants note that Anderson actually states that the "effective temperature of the arc effluent in the examples below was about 5000° K." (Col. 5, lines 40-42). Anderson does not clarify at which location within the apparatus the *effluent arc* is physically located. Nor does such a statement provide a teaching that a volume defined by the reactor chamber is maintained at a substantially uniform temperature as the thoroughly mixed reactant stream passes therethrough.

Applicants, therefore, submit that claim 1 is clearly not anticipated by Anderson. Applicants further submit that claims 2, 3, 5 and 6 are allowable as being dependent from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to claim 3, Applicant fails to find any teaching in Anderson, nor is any cited by the Examiner, that the reactant stream comprises methane or carbon monoxide and the desired end product comprises hydrogen.

Applicants, therefore, respectfully request reconsideration and allowance of claims 1 through 3, 5 and 6.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 3,051,639 to Anderson in view of U.S. Patent No. 4,335,080 to Davis et al., U.S. Patent No. 5,017,754 to Drouet et al., and U.S. Patent No. 3,429,691 to McLaughlin

Claims 4, 8 through 14, 18, 19, 33 through 36, 41 through 46, 50, and 56 through 60 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Anderson (U.S. Patent No. 3,051,639) in view of Davis et al. (U.S. Patent No. 4,335,080), Drouet et al. (U.S. Patent No. 5,017,754), and McLaughlin (U.S. Patent No. 3,429,691). Applicants respectfully traverse this rejection, as hereinafter set forth.

> M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:
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> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.**

> The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

The 35 U.S.C. § 103(a) obviousness rejections of the claims are improper because the references relied upon by the Examiner fail to teach or suggest all of the limitations of the presently clamed invention and because there is a lack of motivation to combine the references in the manner suggested by the Examiner.

Claim 4

Claim 4 depends from independent claim 1 and introduces the additional subject matter that the reactant stream comprises a titanium compound and the desired end product comprises titanium or titanium dioxide.

The Examiner cites Anderson as disclosing all of the subject matter set forth in independent claim 1 except that the reactant stream comprises a titanium compound and that the desired end product comprises titanium or titanium dioxide. The Examiner cites Davis as teaching a plasma apparatus which may used for producing titanium dioxide; McLaughlin as teaching that titanium dioxide may be produced by using a mixture comprised of titanium tetrachloride and oxygen; and Drouet as teaching the use of a plasma reactor "for the benefication of titanium ores and in gas purification and arc starters." (Office Action, pages 4 and 5). The Examiner concludes that it would have been obvious to one of skill in the art to modify the teachings of Anderson with the teachings of Davis, McLaughlin, and Drouet to obtain titanium dioxide. The Examiner states that such modification would have been obvious "because on of ordinary skill in the art would expect a method for producing desired products from a plasma reactor as taught by Davis et al., McLaughlin, and Drouet et al. to be similarly useful and applicable to the plasma process and apparatus for producing desired end product as taught by Anderson." (Office Action, pages 4 and 5).

As discussed above, Applicants submit that Anderson fails to teach or suggest all of the limitations of claim 1 of the presently claimed invention. More particularly, Anderson fails to teach or suggest *thoroughly mixing the reactant stream with a heating gas within the injection*

line prior to its entry into a reactor chamber, or *maintaining a volume defined by the reactor chamber at a substantially uniform temperature as the thoroughly mixed reactant stream passes therethrough.* Applicant submits that Davis, McLaughlin and Drouet also fail to teach or suggest such subject matter. As such, Applicants submit that claim 4 is allowable over the references relied upon by the Examiner at least by virtue of its dependency from an allowable base claim.

Applicants further submit that there is a lack of motivation to combine the references in the manner suggested by the Examiner. Particularly, Applicants submit that the Examiner's statement of motivation to combine the references is simply conclusory. It is noted that Anderson teaches the pyrolization of gases, such as the cracking of methane to produce acetylene. Applicants find no teaching or suggestion by Anderson that the apparatus and method set forth thereby is applicable to the harvesting of fine powders or particles such as, for example, is set forth in Davis. This is particularly evident in the fact that substantially different devices and processes are set forth by the various references relied upon by the Examiner as compared to that disclosed by Anderson. For example, Davis discloses a device with a dual reaction chamber, Drouet et al. discloses a device wherein the feedstock is a powder, and McLaughlin discloses an apparatus which utilizes a counterflow technique.

Applicants submit that one of ordinary skill in the art would recognize that the processes taught by the references relied upon by the Examiner are highly specialized and individualized for specific production purposes. Further, Applicants submit that one of ordinary skill in the art would recognize that the such devices would not be easily modified or altered without experiencing a likely deterioration in their respective performances.

Applicants, therefore, submit that claim 4 is allowable over the references relied upon by the Examiner and respectfully requests reconsideration and allowance thereof.

Claims 8 through 14, 18

Independent claim 8, as amended herein, is directed to a method for thermal conversion of one or more reactants in a thermodynamically stable high temperature gaseous stream to a desired end product in the form of a gas or ultrafine solid particles. The method comprises: introducing a stream of plasma arc gas between electrodes of a plasma torch including at least

one pair of electrodes positioned adjacent to an inlet end of an axial reactor chamber, the stream of plasma arc gas being introduced at a selected plasma gas flow rate while the electrodes are subjected to a selected plasma input power level to produce a plasma in a restricted diameter injection line; forming a gaseous stream by injecting at least one reactant into the injection line and *thoroughly mixing the reactant into the plasma within the injection line*; introducing the gaseous stream into a reactor chamber; *maintaining a volume defined by the reactor chamber at a substantially uniform temperature as the thoroughly mixed stream passes therethrough*; bringing the mixed reactant stream to an equilibrium state; cooling the gaseous stream including passing the gaseous stream through a nozzle at an outlet end of the reactor chamber; and separating the desired end product from gases remaining in the cooled gaseous stream.

The Examiner relies on Anderson, Davis, McLaughlin and Drouet rendering claim 8 obvious. Applicants respectfully disagree. As discussed above, Anderson fails to teach or suggest *mixing the reactant into the plasma within the injection line* which mixing is performed prior to the gas flowing into a reactor chamber. Additionally, Anderson fails to teach or suggest *maintaining a volume defined by the reactor chamber at a substantially uniform temperature as the thoroughly mixed stream passes therethrough.* Applicants further submit that Davis, McLaughlin and Drouet fail to teach or suggest such subject matter.

Applicants, therefore, submit that claim 8 is allowable over Anderson, Davis, McLaughlin and Drouet. Applicants further submit that claims 9 through 14 and 18 are allowable as being dependent from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to claim 10, Applicant fails to find any teaching or suggestion in the references cited by the Examiner, nor is any specific teaching cited by the Examiner in such references, that the reactant stream comprises methane or carbon monoxide and the desired end product comprises hydrogen.

With respect to claim 18, Applicants submit that the references relied upon by the Examiner fail to teach or suggest producing *a turbulent flow of the at least one reactant and the plasma* within the *injection line.*

Applicants, therefore, respectfully request reconsideration and allowance of claims 8

through 14 and 18.

Claims 33 through 36 and 42 through 45

Independent claim 33, as amended herein, is directed to a method for thermally converting one or more reactants in a thermodynamically stable high temperature gaseous stream to a desired end product in the form of a gas or ultrafine solid particles. The method comprises: introducing a reactant stream into an axial reactor at an upstream end thereof; heating the reactant stream as the reactant stream flows axially through an injection line; passing the reactant stream axially through a volume defined by a reactor chamber of the axial reactor; *maintaining the volume defined by the reactor chamber at a substantially uniform temperature*; producing a stream containing the desired product stream at a location adjacent an outlet end of the reactor chamber; and cooling stream containing the desired end product exiting from the reactor chamber.

As discussed above herein, Applicants submit that the references relied upon by the Examiner fail to teach or suggest maintaining a volume defined by the reactor chamber at a substantially uniform temperature. As such, Applicants submit that claim 33 is not rendered obvious by the combination of Anderson, Davis, McLaughlin and Drouet.

Applicants further submit that claims 34 through 36 and 42 through 45 are allowable as being dependent from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to claim 34, Applicants submit that the references relied upon by the Examiner fail to teach or suggest *producing a turbulent flow within the injection line* and *thoroughly mixing the reactant stream with a heating gas within the turbulent flow.*

With respect to claims 42 and 43, Applicants note that such claims depend from claim 37, which claim is not rejected as being obvious under the combination of Anderson, Davis, McLaughlin and Drouet. As such, Applicants submit that claims 42 and 43 are allowable over such a combination.

Moreover, with respect to claim 42, Applicants submit that the references relied upon by the Examiner fail to teach or suggest controlling the residence time and reaction pressure of the

reactant stream within the reactor chamber by configuring the restrictive open throat to exhibit a desired cross-sectional area as taken substantially transverse to any flow therethrough.

With respect to claim 43, Applicants submit that the references relied upon by the Examiner fail to teach or suggest subjecting the stream containing the desired end product to an ultra fast decrease in pressure by smoothly accelerating and expanding the moving stream containing the desired end product along the diverging section of the nozzle.

Applicants, therefore, respectfully request reconsideration and allowance of claims 33 through 36 and 42 through 45.

Claims 46, 50, 56 and 57

Independent claim 46, as amended herein, is directed to a method of forming a metal, metal oxide or metal alloy from a metal-containing compound. The method comprises: providing a plasma formed from a gas comprising an inert gas, hydrogen, or a mixture thereof; providing a reagent or a reagent mixture, the reagent or reagent mixture comprising a gaseous or volatilized compound of a selected metal; *thoroughly mixing the reagent or reagent mixture with the plasma at a location upstream from an axial reactor chamber* to produce a reactant stream; passing the reactant stream axially through the reactor chamber; *maintaining the reactor chamber at a substantially uniform temperature*; producing a product stream at a location adjacent an outlet end of the reactor chamber, the product stream including an equilibrium mixture comprising the selected metal, metal oxide or metal alloy, wherein the selected metal, metal oxide or metal alloy being thermodynamically stable; cooling the product stream exiting the outlet end of the reactor chamber; and separating the metal, metal oxide or metal alloy from gases remaining in the cooled product stream.

As discussed above herein, Applicants submit that the references relied upon fail to teach or suggest thoroughly mixing a reagent or reagent mixture with the plasma at a location upstream from the reactor chamber. Nor do the references relied upon by the Examiner teach or suggest maintaining the reactor chamber at a substantially uniform temperature. As such, Applicants submit that claim 46 is allowable over the combination of Anderson, Davis, McLaughlin and Drouet.

Applicants further submit that claims 50, 56 and 57 are allowable at least by virtue of their dependency from an allowable base claim. Applicants, therefore, respectfully request reconsideration and allowance of claims 46, 50, 56 and 57.

Claims 58 through 60

Independent claim 58, as amended herein, is directed to a method of forming a desired product from a hydrocarbon. The method comprises: providing a plasma formed from a gas comprising an inert gas, hydrogen, or a mixture thereof; providing a reagent or a reagent mixture, the reagent or reagent mixture comprising gaseous or volatilized hydrocarbon; *thoroughly mixing the reagent or reagent mixture with the plasma at a location upstream from a reactor chamber* to produce a reactant stream; passing the reactant stream axially through a volume defined by the reactor chamber; *maintaining the volume defined by the reactor chamber at a substantially uniform temperature*; forming a product stream including an equilibrium mixture comprising the desired product, the desired product being thermodynamically stable; cooling the product stream as it exits an outlet end of the reactor chamber; and separating the desired end product from gases remaining in the cooled product stream.

As discussed above herein, Applicants submit that the references relied upon fail to teach or suggest thoroughly mixing a reagent or reagent mixture with the plasma at a location upstream from the reactor chamber. Nor do the references relied upon by the Examiner teach or suggest maintaining the volume defined by the reactor chamber at a substantially uniform temperature. As such, Applicants submit that claim 58 is allowable over the combination of Anderson, Davis, McLaughlin and Drouet.

Applicants further submit that that claims 60 and 61 are allowable at least by virtue of their dependency from an allowable base claim. Applicants, therefore, respectfully request reconsideration and allowance of claims 58, 60 and 61.

Obviousness Rejection Based on U.S. Patent No. 3,051,639 to Anderson in view of U.S. Patent No. 3,954,954 to Davis et al.

Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Anderson

(U.S. Patent No. 3,051,639) in view of Davis et al. (U.S. Patent No. 3,954,954).

Claim 7 depends from independent claim 1 by way of intervening claim 5 and introduces the additional subject matter of wherein maintaining the temperature within the reactor chamber between about 1500° C and about 2500° C. The Examiner cites Davis '954 as teaching a temperature of 1800° K to 5000° K.

As set forth above, Anderson fails to teach or suggest all of the limitations of independent claim 1. More specifically, Anderson fails to teach or suggest teach or suggest *thoroughly mixing the reactant stream with a heating gas within the injection line* prior to its entry into a reactor chamber, or *maintaining a volume defined by the reactor chamber at a substantially uniform temperature as the thoroughly mixed reactant stream passes therethrough.* Applicants further submit that Davis '954 fails to teach or suggest such subject matter.

Moreover, Applicants submit that there is a lack of motivation to combine Davis '954 with Anderson as Anderson discloses a process for cracking methane gas to produce acetylene while Davis '954 teaches a process of carrying out reduction reactions to produce elemental metal powders. Applicants submit that those of ordinary skill in the art would recognize that the specific process acts, such as temperature ranges, for producing elemental powders would not likely be appropriate for production of acetylene and thus would not combine the teachings of such references.

Applicants, therefore, submit that claim 7 is allowable over Anderson and Davis '954 and respectfully requests reconsideration and allowance thereof.

Obviousness Rejection Based on U.S. Patent No. 3,051,639 to Anderson in view of U.S. Patent No. 4,335,080 to Davis et al., U.S. Patent No. 3,429,691 to McLaughlin, and U.S. Patent No. 5,017,754 to Drouet et al. as applied to claims 4, 8-14, 18, 19, 33-36, 41-46, 50 and 56-60 above, and further in view of U.S. Patent No. 3,954,954 to Davis et al.

Claims 15 and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Anderson (U.S. Patent No. 3,051,639) in view of Davis et al. (U.S. Patent No. 4,335,080), McLaughlin (U.S. Patent No. 3,429,691), and Drouet et al. (U.S. Patent No. 5,017,754) as applied to claims 4, 8-14, 18, 19, 33-36, 41-46, 50 and 56-60 above, and further in view of Davis

et al. (U.S. Patent No. 3,954,954). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claims 15 and 16 each depend from independent claim 8 by way of intervening claim 12. The Examiner relies on Anderson, Davis '080, McLaughlin and Drouet as disclosing the subject matter of claims 8 and 12, and further relies on Davis '954 as teaching temperature of 1800° K to 5000° K.

As discussed above, Applicants submit that the combination of Anderson, Davis '080, McLaughlin and Drouet fail to teach or suggest all of the limitations of independent claim 8. More particularly, this combination of references fails to teach or suggest *mixing the reactant into the plasma within the injection line* which mixing is performed prior to the gas flowing into a reactor chamber. Additionally, this combination fails to teach or suggest *maintaining a volume defined by the reactor chamber at a substantially uniform temperature as the thoroughly mixed stream passes therethrough.* Applicants submit that Davis '954 likewise fails to teach or suggest such subject matter.

Moreover, Applicants submit that there is a lack of motivation to combine Anderson, Davis '080, McLaughlin, Drouet and Davis '954. The references relied upon by the Examiner teach substantially different processes relying upon specific features and process acts to achieve their respective purposes. For example, Anderson discloses a process for cracking methane gas to produce acetylene while Davis '954 teaches a process of carrying out reduction reactions to produce elemental metal powders. Applicants submit that those of ordinary skill in the art would recognize that the specific process acts, such as temperature ranges, for producing elemental powders would not likely be appropriate for production of acetylene and thus would not combine the teachings of such references.

Applicants, therefore, submit that claims 15 and 16 are allowable over Anderson, Davis '080, McLaughlin, Drouet and Davis '954 and respectfully requests reconsideration and allowance thereof.

Obviousness Rejection Based on U.S. Patent No. 3,051,639 to Anderson in view of U.S. Patent No. 4,335,080 to Davis et al., U.S. Patent No. 3,429,691 to McLaughlin, and U.S. Patent No.

5,017,754 to Drouet et al. as applied to claims 4, 8-14, 18, 19, 33-36, 41-46, 50 and 56-60 above, and further in view of "Application of Nonequilibrium Gas-Dynamic Techniques to the Plasma Synthesis of Ceramic Powders" to McFeaters et al.

Claims 17 and 37 through 40 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Anderson (U.S. Patent No. 3,051,639) in view of Davis et al. (U.S. Patent No. 4,335,080), McLaughlin (U.S. Patent No. 3,429,691), and Drouet et al. (U.S. Patent No. 5,017,754) as applied to claims 4, 8-14, 18, 19, 33-36, 41-46, 50 and 56-60 above, and further in view of McFeaters ("Application of Nonequilibrium Gas-Dynamic Techniques to the Plasma Synthesis of Ceramic Powders"). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claim 17

Claim 17 depends from independent claim 8 by way of intervening claim 12 and introduces the additional subject matter of passing the gaseous stream through a coaxial convergent-divergent nozzle positioned in the outlet end of the reactor chamber. The Examiner relies on the combination of Anderson, Davis ('080), McLaughlin and Drouet as rendering claim 8 obvious. The Examiner further cites McFeaters as disclosing the use of a converging-diverging nozzle to achieve high cooling rates.

As discussed above herein, the combination of Anderson, Davis, McLaughlin and Drouet fail to teach or suggest all of the limitations of independent claim 8. More particularly, this combination of references fails to teach or suggest *mixing the reactant into the plasma within the injection line* which mixing is performed prior to the gas flowing into a reactor chamber. Additionally, this combination fails to teach or suggest *maintaining a volume defined by the reactor chamber at a substantially uniform temperature as the thoroughly mixed stream passes therethrough.* Applicants submit that McFeaters likewise fails to teach or suggest such subject matter.

Furthermore, Applicants submit that there is a lack of motivation to combine Anderson, Davis, McLaughlin, Drouet and McFeaters. The references relied upon by the Examiner teach substantially different processes relying upon specific features and process acts to achieve their

respective purposes. For example, Anderson discloses a process for cracking methane gas to produce acetylene while McFeaters discloses a theoretical model of reducing titanium dioxide to form titanium carbide. Applicants submit that those of ordinary skill in the art would recognize that the specific process acts, or apparatus features, used in conjunction with the production of titanium carbide would not necessarily be appropriate for production of acetylene and thus would not combine the teachings of such references.

Applicants, therefore, submit that claim 17 is allowable over Anderson, Davis, McLaughlin, Drouet and McFeaters and respectfully requests reconsideration and allowance thereof.

Claims 37, 39 and 40

Claims 37, 39 and 40 each depend from independent claim 33 either directly or through intervening claims. The Examiner relies on the combination of Anderson, Davis ('080), McLaughlin and Drouet as rendering claim 33 obvious. The Examiner further cites McFeaters as disclosing the use of a converging-diverging nozzle to achieve high cooling rates.

As discussed above herein, the combination of Anderson, Davis, McLaughlin and Drouet fail to teach or suggest all of the limitations of independent claim 33. More particularly, this combination of references fails to teach or suggest maintaining a volume defined by the reactor chamber at a substantially uniform temperature. Applicants submit that McFeaters likewise fails to teach or suggest such subject matter.

Furthermore, Applicants submit that there is a lack of motivation to combine Anderson, Davis, McLaughlin, Drouet and McFeaters. The references relied upon by the Examiner teach substantially different processes relying upon specific features and process acts to achieve their respective purposes. For example, Anderson discloses a process for cracking methane gas to produce acetylene while McFeaters discloses a theoretical model of reducing titanium dioxide to form titanium carbide. Applicants submit that those of ordinary skill in the art would recognize that the specific process acts, or apparatus features, used in conjunction with the production of titanium carbide would not necessarily be appropriate for production of acetylene and thus would not combine the teachings of such references.

Additionally, with respect to claim 39, Applicants submit that McFeaters fails to teach or suggest passing the stream containing the desired end product through a converging-diverging nozzle wherein the diverging section of the nozzle exhibits an included angle of less than about 35°.

Applicants, therefore, submit that claim 37, 39 and 40 are allowable over Anderson, Davis, McLaughlin, Drouet and McFeaters and respectfully requests reconsideration and allowance thereof.

ENTRY OF AMENDMENTS

The amendments to claims 1, 5-18, 33-37, 39, 40, 42-46, 50 and 58 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application.

CONCLUSION

Claims 1 through 18, 33 through 37, 39, 40, 42 through 46, 50, and 56 through 60 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,

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